

CORAL RIDGE SUBDIVISION

DRAINAGE REPORT

FOR

City of Bryant, AR

March 2021
Northlake Rd.
Bryant, AR

By:

HOPE
CONSULTING
ENGINEERS - SURVEYORS

Storm Drainage Summary for Coral Ridge subdivision

Coral Ridge is a proposed residential subdivision within the City of Bryant jurisdiction. This subdivision is anticipated to be built in one phase.

Tract A and B are designed for the total buildout. Summary of the Tract-A and B calculations are below:

Detention Pond Tract-A

- Pond is situated on the south side of the property.
- Pond has an area of 0.20 acres with bottom elevation of 490.5’.
- One 18” RCP with 0.50% slope are considered for outflow culvert.
- For 100-year frequency, the peak discharges for pre-development and post development stage have been calculated as 9.54 cfs and 5.71 cfs respectively (Attachment- Tract-A).
- Peak flows for Pre and post development phase have been tabulated below-

	Pre-development Tract-A	Post-development Tract-A
	Peak Flow (cfs)	Peak Flow (cfs)
2-Year	5.05	2.84
5-Year	5.57	3.22
10-Year	6.76	4.03
25-Year	7.80	4.76
50-Year	8.89	5.48
100-Year	9.54	5.71

Detention Pond Tract-B

- Pond is situated on the north side of the property.
- Pond has an area of 0.12 acres with bottom elevation of 481’.
- One 24” RCP 0.50% slope is considered for outflow culvert.
- For 100-year frequency, the peak discharges for pre-development and post development stage have been calculated as 15.16 cfs and 15.09 cfs respectively (Attachment- Tract-B).
- Peak flows for Pre and post development phase have been tabulated below-

	Pre-development Tract-B	Post-development Tract-B
	Peak Flow (cfs)	Peak Flow (cfs)
2-Year	7.86	7.12
5-Year	8.71	7.95
10-Year	10.67	9.54
25-Year	12.36	10.51
50-Year	14.04	12.80
100-Year	15.16	15.09

Multi-Hydrograph Plot

Hyd. No. 1

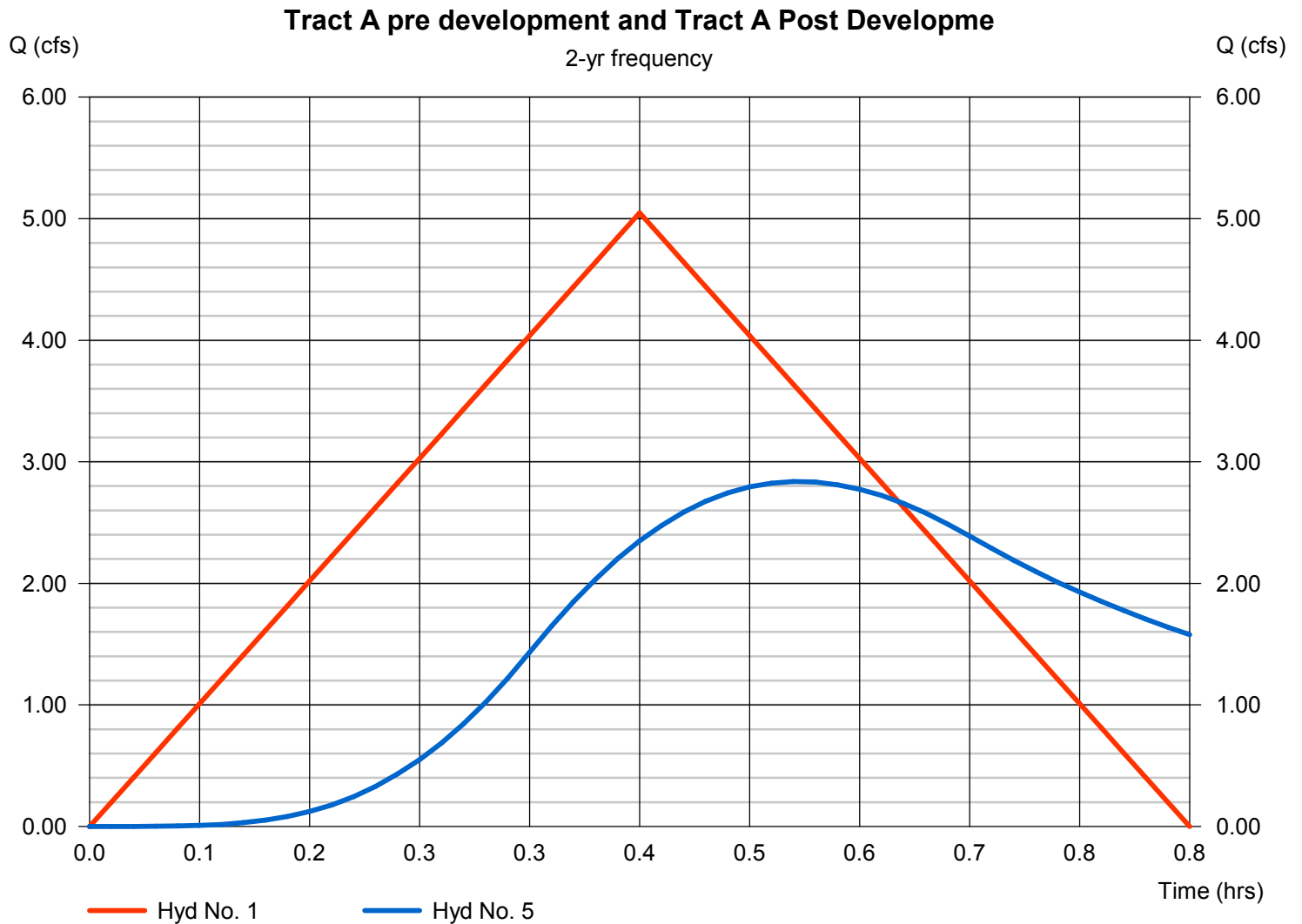
Tract A pre development

Hydrograph type = Rational
Peak discharge = 5.047 cfs
Time to peak = 0.42 hrs
Hyd. Volume = 7,571 cuft

Hyd. No. 5

Tract A Post Developme

Hydrograph type = Reservoir
Peak discharge = 2.84 cfs
Time to peak = 0.53 hrs
Hyd. Volume = 8,716 cuft



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No. 1

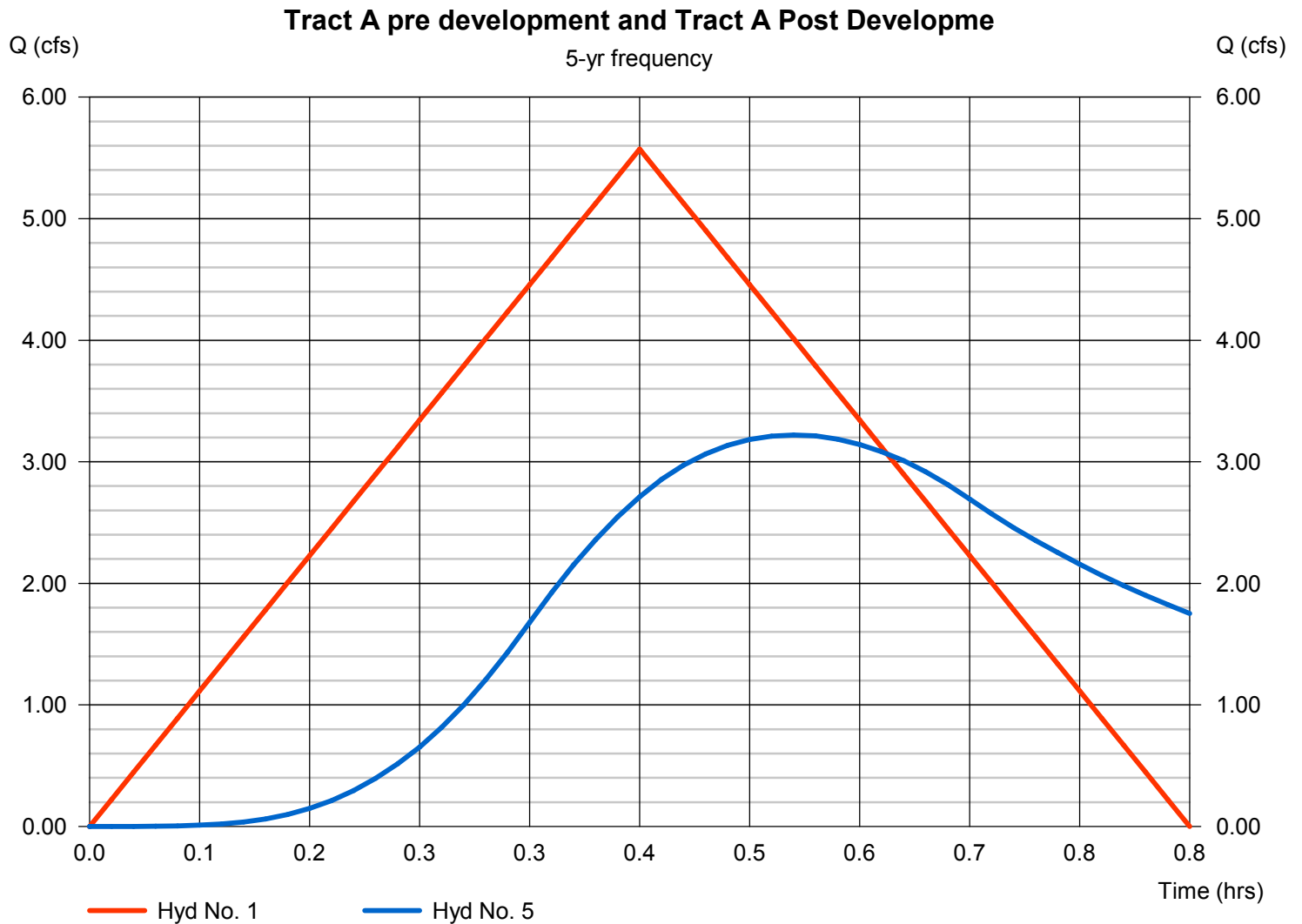
Tract A pre development

Hydrograph type = Rational
Peak discharge = 5.572 cfs
Time to peak = 0.42 hrs
Hyd. Volume = 8,358 cuft

Hyd. No. 5

Tract A Post Developme

Hydrograph type = Reservoir
Peak discharge = 3.22 cfs
Time to peak = 0.53 hrs
Hyd. Volume = 9,617 cuft



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No. 1

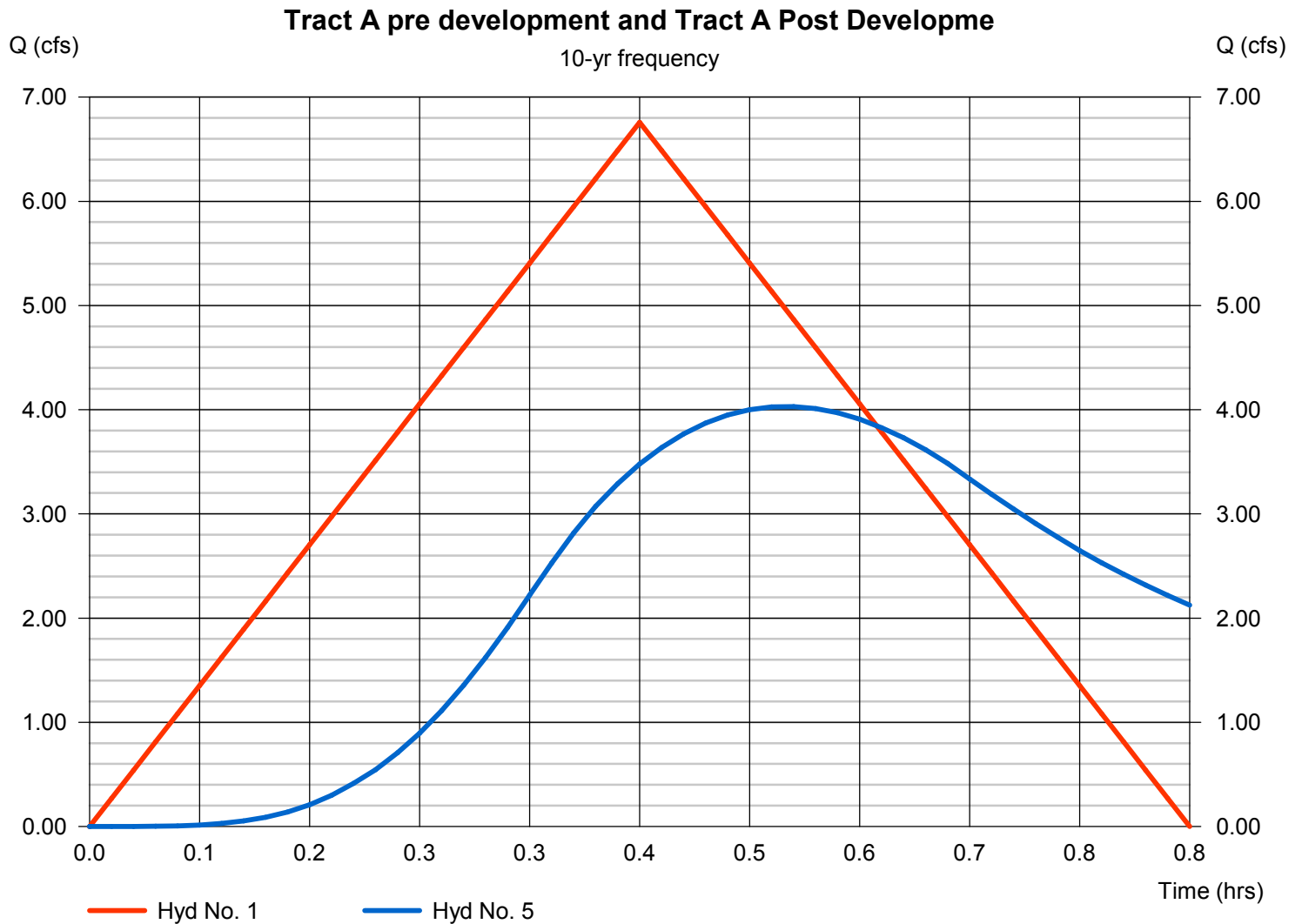
Tract A pre development

Hydrograph type = Rational
Peak discharge = 6.758 cfs
Time to peak = 0.42 hrs
Hyd. Volume = 10,137 cuft

Hyd. No. 5

Tract A Post Developme

Hydrograph type = Reservoir
Peak discharge = 4.03 cfs
Time to peak = 0.53 hrs
Hyd. Volume = 11,514 cuft



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No. 1

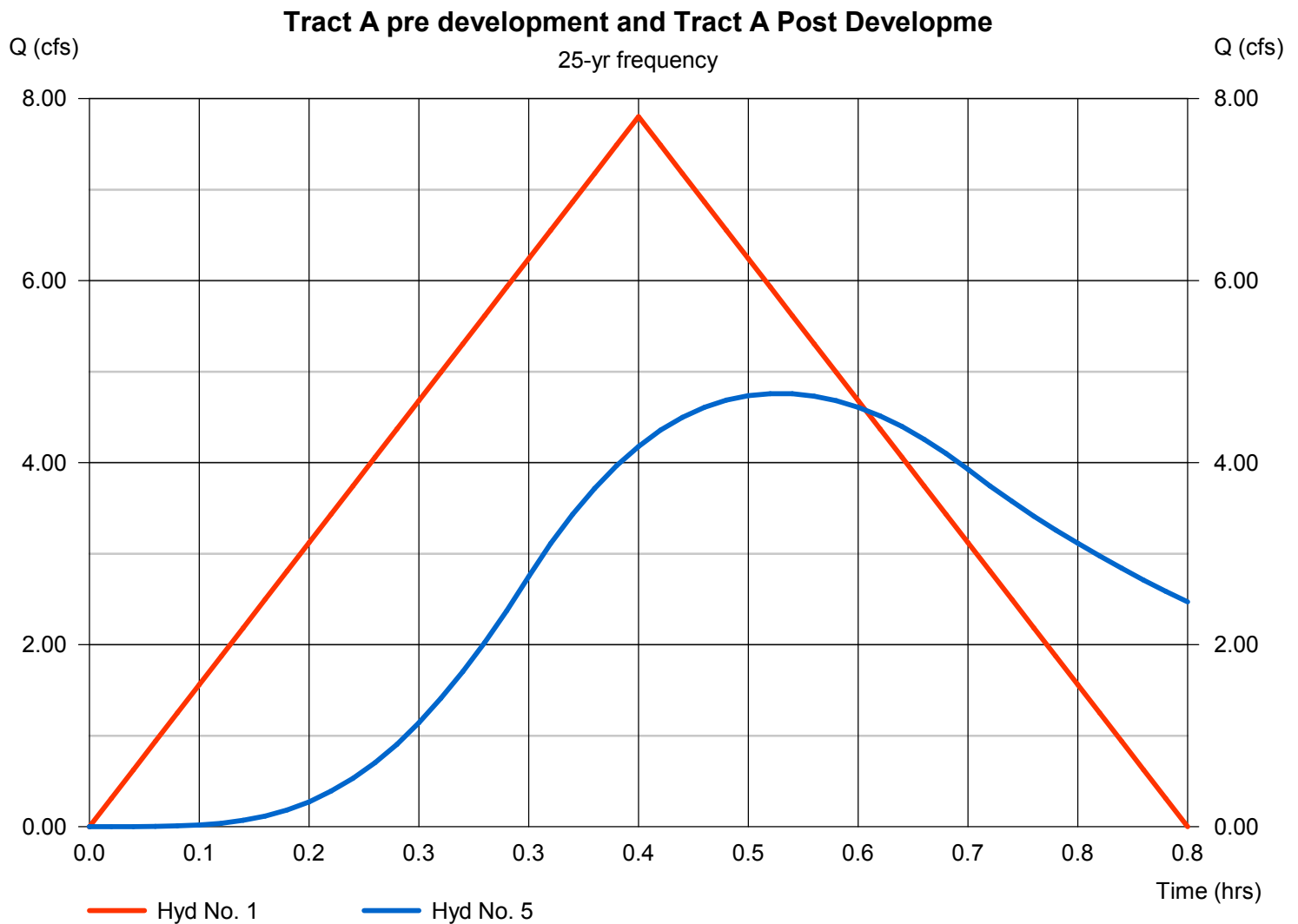
Tract A pre development

Hydrograph type = Rational
Peak discharge = 7.802 cfs
Time to peak = 0.42 hrs
Hyd. Volume = 11,703 cuft

Hyd. No. 5

Tract A Post Developme

Hydrograph type = Reservoir
Peak discharge = 4.76 cfs
Time to peak = 0.52 hrs
Hyd. Volume = 13,255 cuft



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No. 1

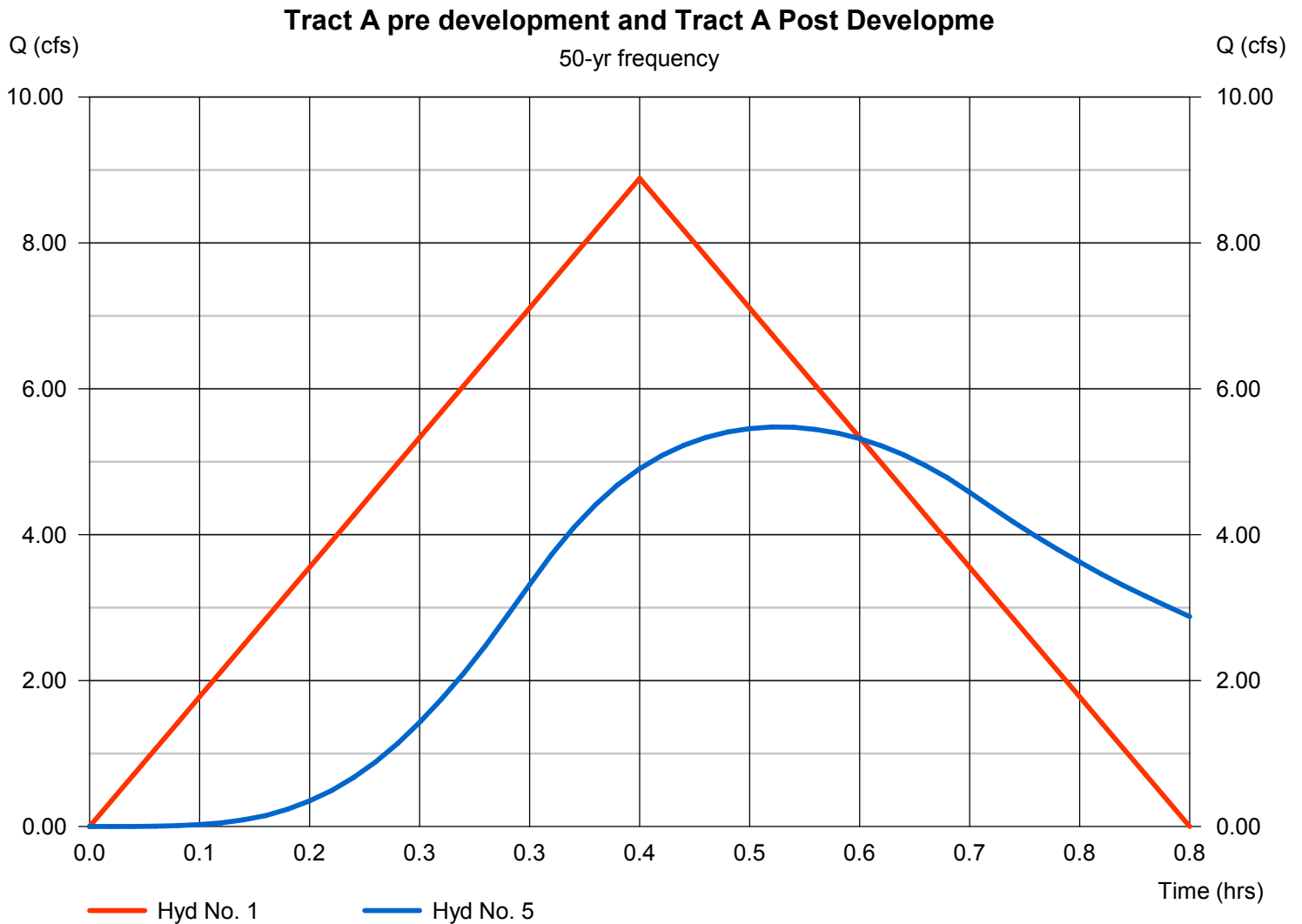
Tract A pre development

Hydrograph type = Rational
Peak discharge = 8.887 cfs
Time to peak = 0.42 hrs
Hyd. Volume = 13,330 cuft

Hyd. No. 5

Tract A Post Developme

Hydrograph type = Reservoir
Peak discharge = 5.48 cfs
Time to peak = 0.52 hrs
Hyd. Volume = 15,124 cuft



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No. 1

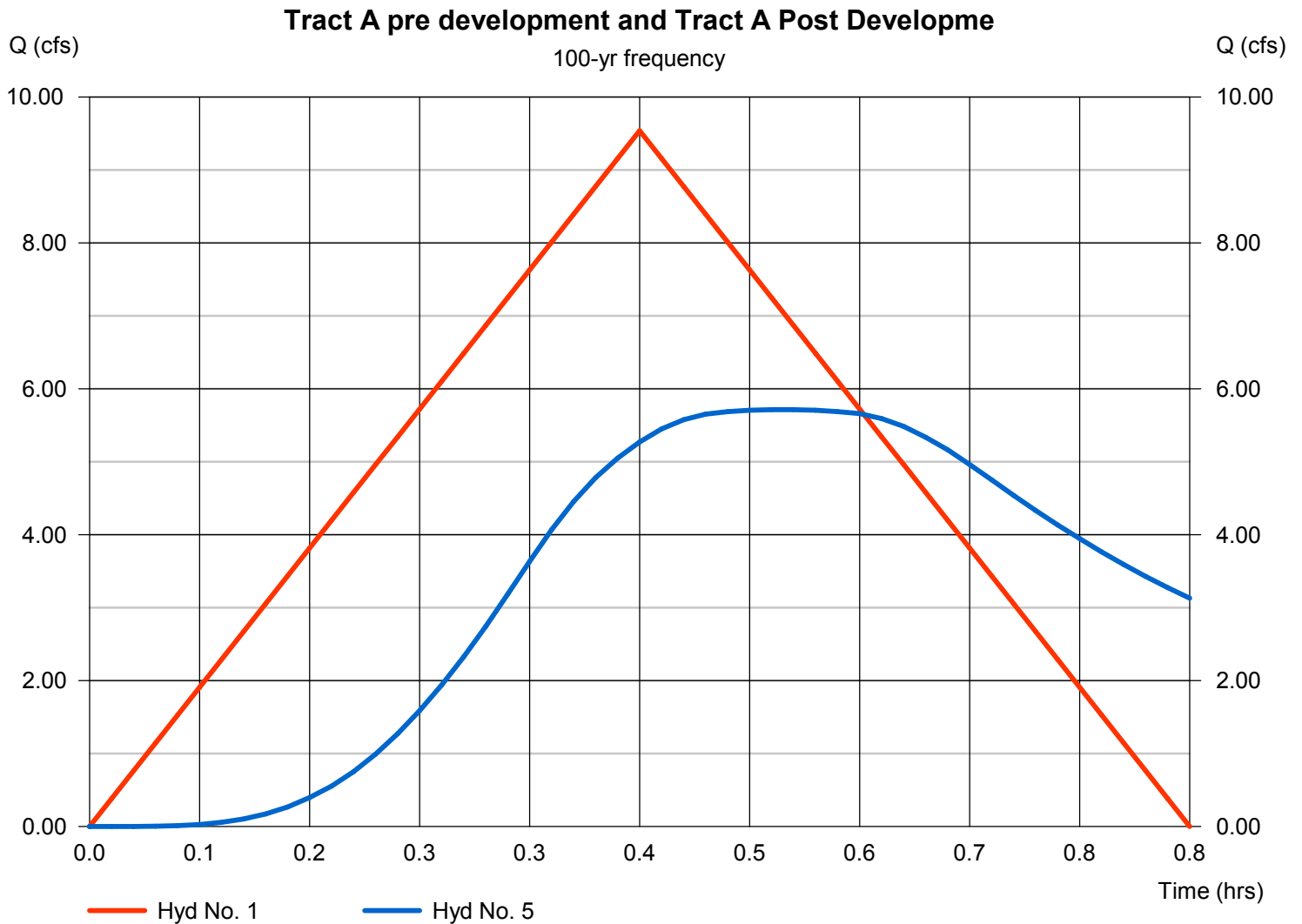
Tract A pre development

Hydrograph type = Rational
Peak discharge = 9.540 cfs
Time to peak = 0.42 hrs
Hyd. Volume = 14,309 cuft

Hyd. No. 5

Tract A Post Developme

Hydrograph type = Reservoir
Peak discharge = 5.71 cfs
Time to peak = 0.53 hrs
Hyd. Volume = 16,146 cuft



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No. 3

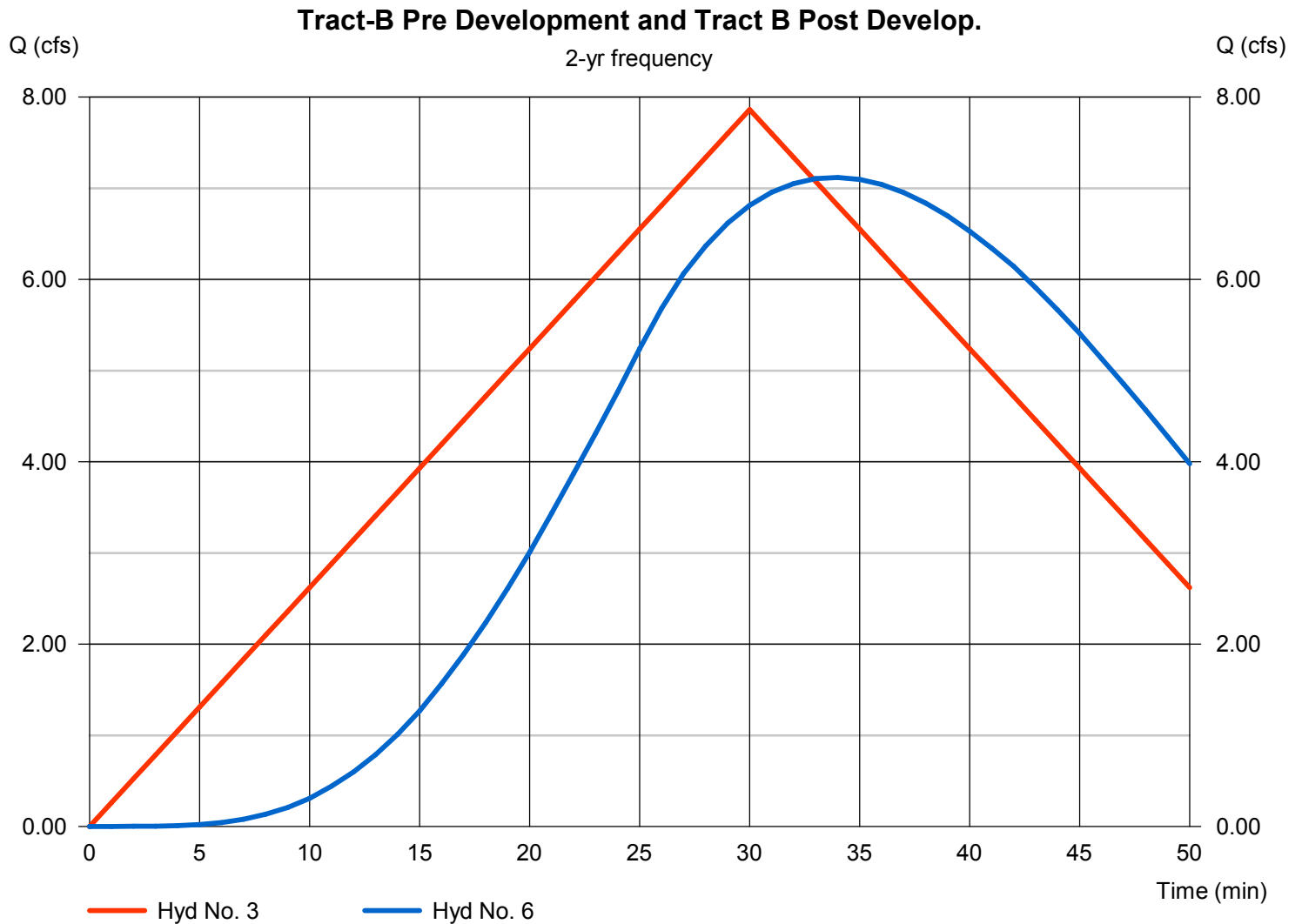
Tract-B Pre Development

Hydrograph type = Rational
Peak discharge = 7.862 cfs
Time to peak = 30 min
Hyd. Volume = 14,152 cuft

Hyd. No. 6

Tract B Post Develop.

Hydrograph type = Reservoir
Peak discharge = 7.12 cfs
Time to peak = 34 min
Hyd. Volume = 16,508 cuft



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No. 3

Tract-B Pre Development

Hydrograph type = Rational
Peak discharge = 8.705 cfs
Time to peak = 30 min
Hyd. Volume = 15,669 cuft

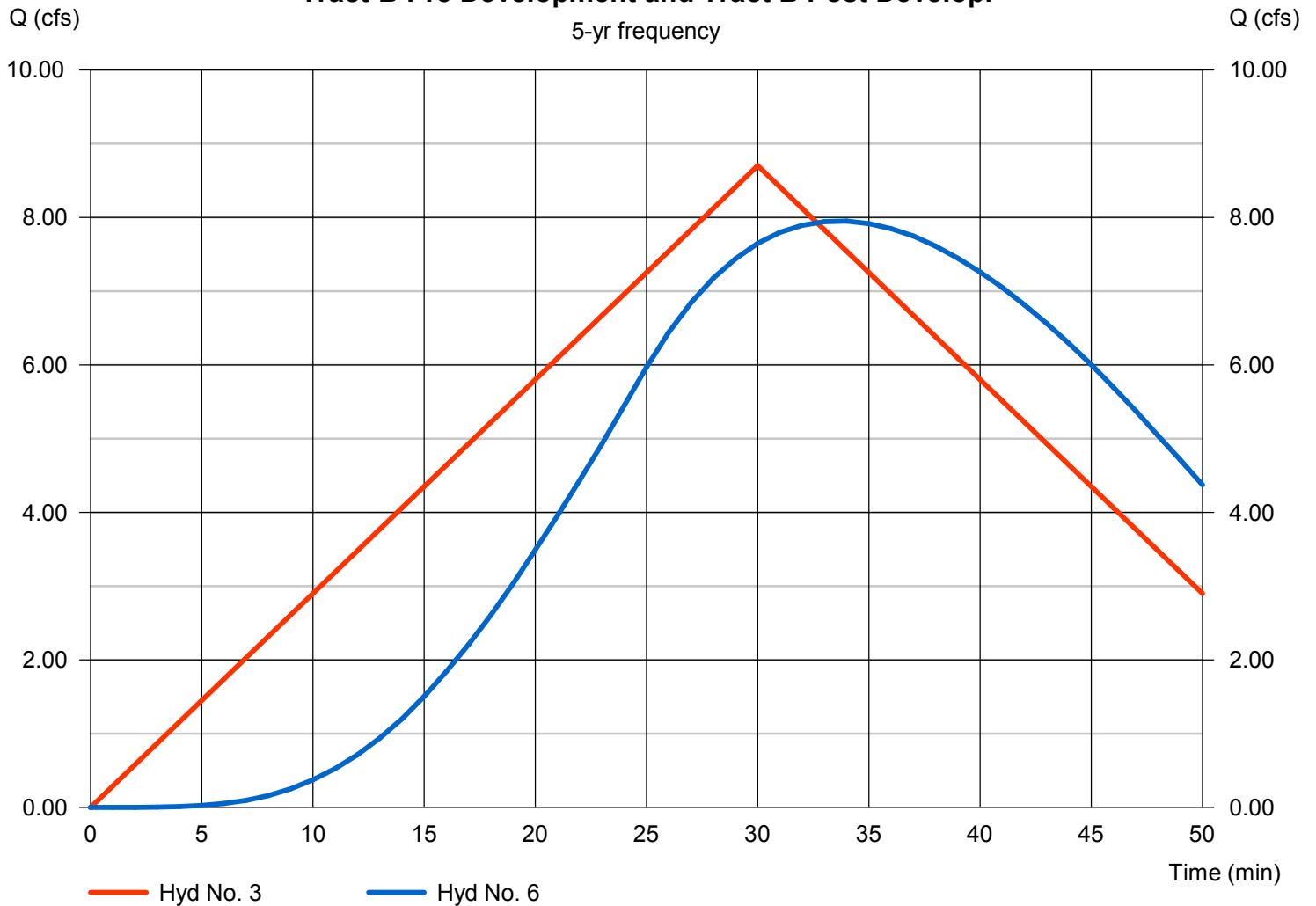
Hyd. No. 6

Tract B Post Develop.

Hydrograph type = Reservoir
Peak discharge = 7.95 cfs
Time to peak = 34 min
Hyd. Volume = 18,226 cuft

Tract-B Pre Development and Tract B Post Develop.

5-yr frequency



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No. 3

Tract-B Pre Development

Hydrograph type = Rational
Peak discharge = 10.67 cfs
Time to peak = 30 min
Hyd. Volume = 19,207 cuft

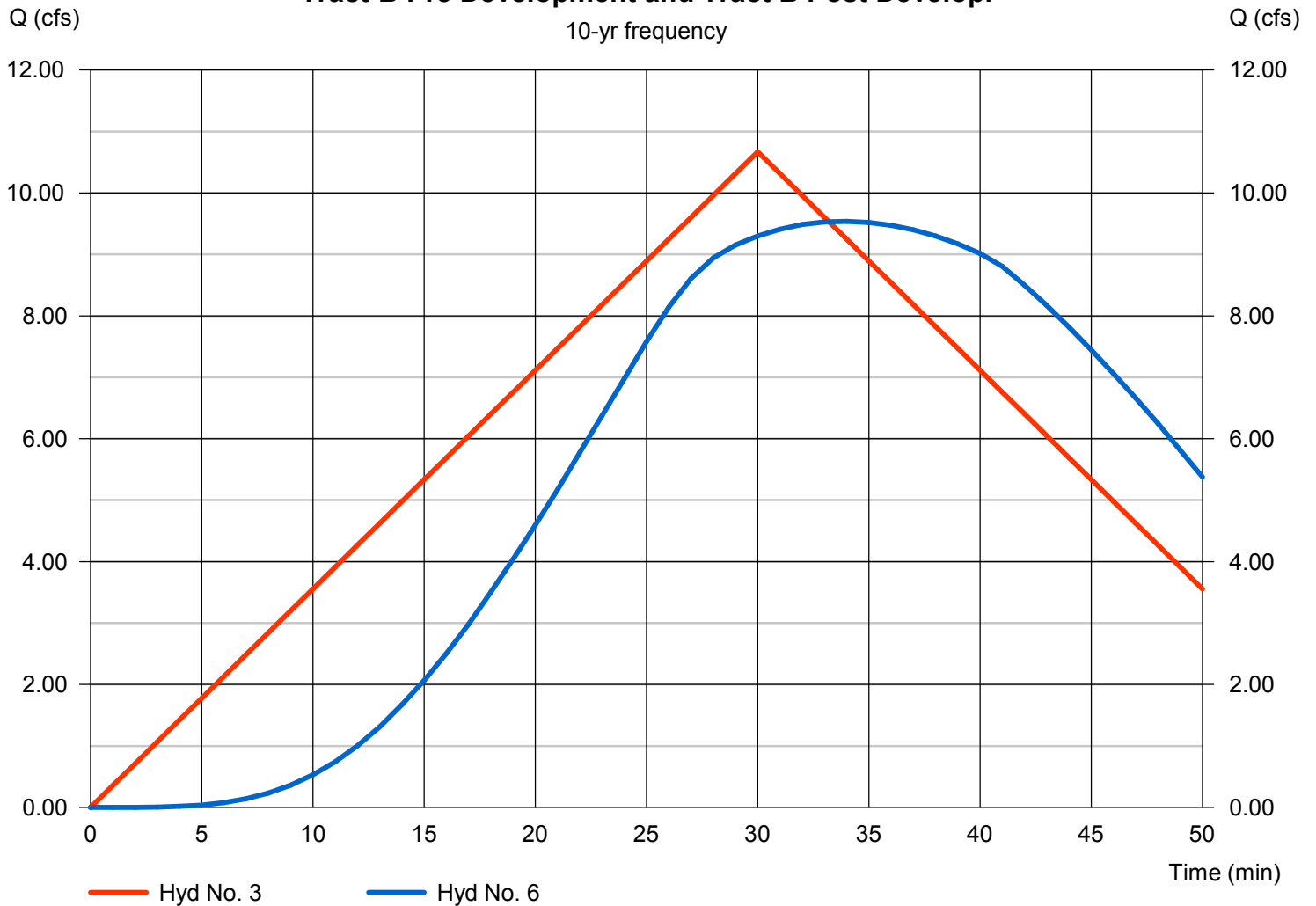
Hyd. No. 6

Tract B Post Develop.

Hydrograph type = Reservoir
Peak discharge = 9.54 cfs
Time to peak = 34 min
Hyd. Volume = 22,114 cuft

Tract-B Pre Development and Tract B Post Develop.

10-yr frequency



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No. 3

Tract-B Pre Development

Hydrograph type = Rational
Peak discharge = 12.36 cfs
Time to peak = 30 min
Hyd. Volume = 22,239 cuft

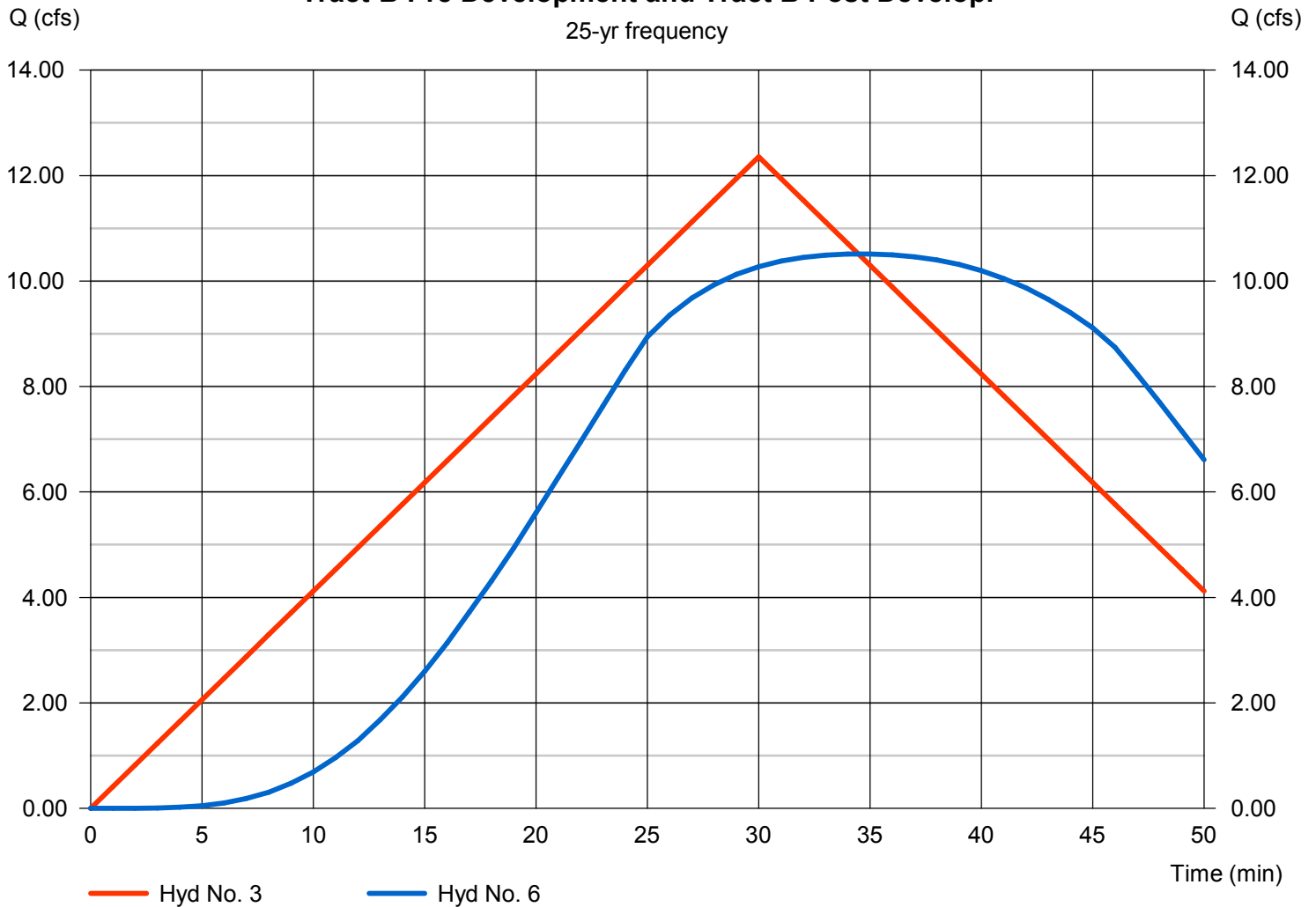
Hyd. No. 6

Tract B Post Develop.

Hydrograph type = Reservoir
Peak discharge = 10.51 cfs
Time to peak = 35 min
Hyd. Volume = 25,535 cuft

Tract-B Pre Development and Tract B Post Develop.

25-yr frequency



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No. 3

Tract-B Pre Development

Hydrograph type = Rational
Peak discharge = 14.04 cfs
Time to peak = 30 min
Hyd. Volume = 25,272 cuft

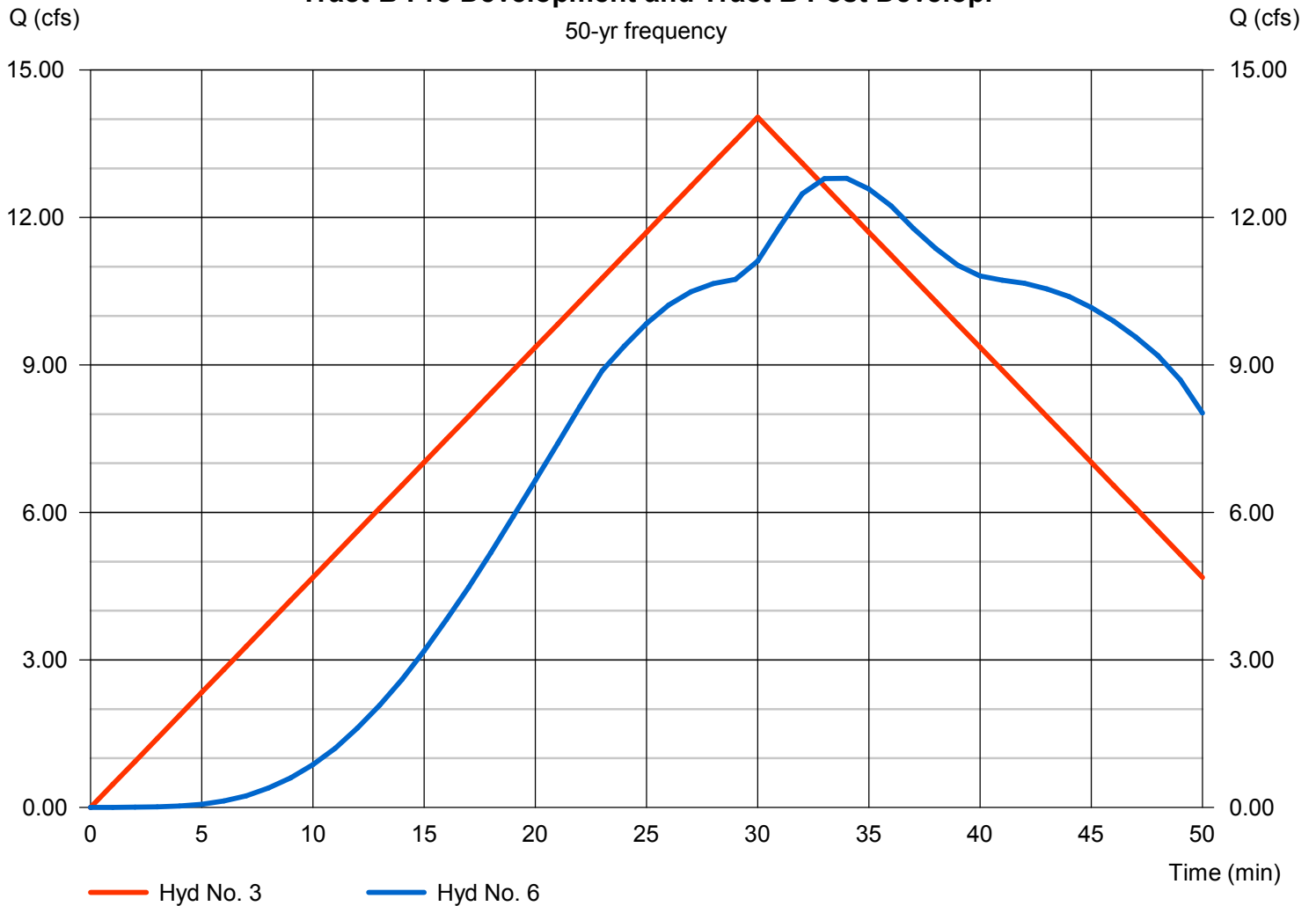
Hyd. No. 6

Tract B Post Develop.

Hydrograph type = Reservoir
Peak discharge = 12.80 cfs
Time to peak = 34 min
Hyd. Volume = 29,089 cuft

Tract-B Pre Development and Tract B Post Develop.

50-yr frequency



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No. 3

Tract-B Pre Development

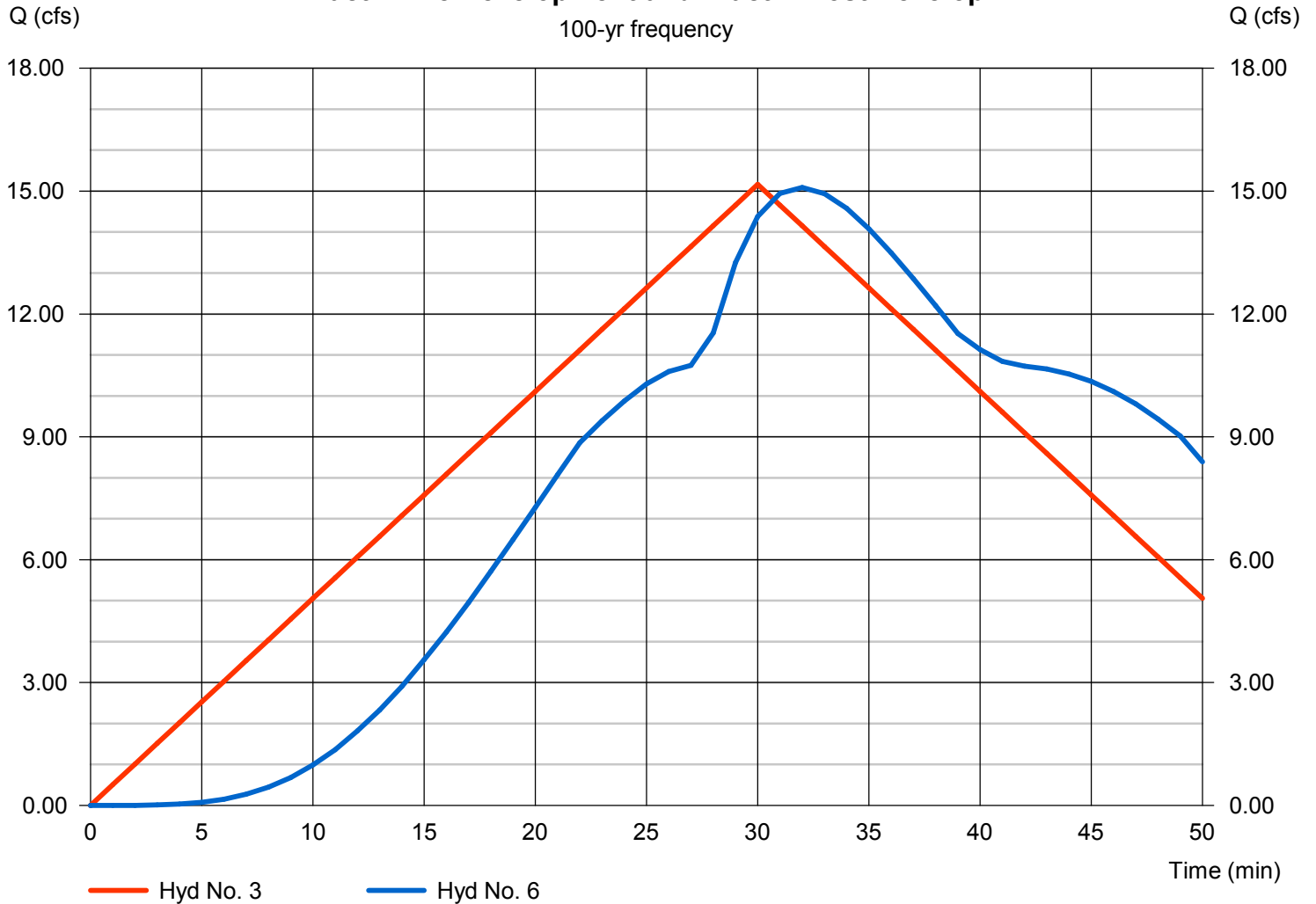
Hydrograph type = Rational
Peak discharge = 15.16 cfs
Time to peak = 30 min
Hyd. Volume = 27,294 cuft

Hyd. No. 6

Tract B Post Develop.

Hydrograph type = Reservoir
Peak discharge = 15.09 cfs
Time to peak = 32 min
Hyd. Volume = 31,229 cuft

Tract-B Pre Development and Tract B Post Develop.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	Rational	5.047	1	25	7,571	-----	-----	-----	Tract A pre development	
2	Rational	7.302	1	20	8,763	-----	-----	-----	Tract A Post Development	
3	Rational	7.862	1	30	14,152	-----	-----	-----	Tract-B Pre Development	
4	Rational	11.03	1	25	16,540	-----	-----	-----	Tract-B Post Development	
5	Reservoir	2.837	1	32	8,716	2	489.87	5,970	Tract A Post Develop.	
6	Reservoir	7.120	1	34	16,508	4	483.31	7,508	Tract B Post Develop.	
21-0209-Oltman Northlake_03-08-2021.gpw					Return Period: 2 Year			Monday, 03 / 15 / 2021		

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	5.572	1	25	8,358	-----	-----	-----	Tract A pre development
2	Rational	8.053	1	20	9,664	-----	-----	-----	Tract A Post Development
3	Rational	8.705	1	30	15,669	-----	-----	-----	Tract-B Pre Development
4	Rational	12.17	1	25	18,259	-----	-----	-----	Tract-B Post Development
5	Reservoir	3.221	1	32	9,617	2	489.94	6,472	Tract A Post Develop.
6	Reservoir	7.950	1	34	18,226	4	483.41	8,102	Tract B Post Develop.
21-0209-Oltman Northlake_03-08-2021.gpw					Return Period: 5 Year			Monday, 03 / 15 / 2021	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	6.758	1	25	10,137	-----	-----	-----	Tract A pre development
2	Rational	9.634	1	20	11,561	-----	-----	-----	Tract A Post Development
3	Rational	10.67	1	30	19,207	-----	-----	-----	Tract-B Pre Development
4	Rational	14.76	1	25	22,147	-----	-----	-----	Tract-B Post Development
5	Reservoir	4.031	1	32	11,514	2	490.08	7,512	Tract A Post Develop.
6	Reservoir	9.538	1	34	22,114	4	483.62	9,508	Tract B Post Develop.
21-0209-Oltman Northlake_03-08-2021.gpw					Return Period: 10 Year			Monday, 03 / 15 / 2021	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	7.802	1	25	11,703	-----	-----	-----	Tract A pre development
2	Rational	11.09	1	20	13,302	-----	-----	-----	Tract A Post Development
3	Rational	12.36	1	30	22,239	-----	-----	-----	Tract-B Pre Development
4	Rational	17.04	1	25	25,567	-----	-----	-----	Tract-B Post Development
5	Reservoir	4.759	1	31	13,255	2	490.21	8,457	Tract A Post Develop.
6	Reservoir	10.51	1	35	25,535	4	483.84	10,962	Tract B Post Develop.
21-0209-Oltman Northlake_03-08-2021.gpw					Return Period: 25 Year			Monday, 03 / 15 / 2021	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	Rational	8.887	1	25	13,330	-----	-----	-----	Tract A pre development	
2	Rational	12.64	1	20	15,171	-----	-----	-----	Tract A Post Development	
3	Rational	14.04	1	30	25,272	-----	-----	-----	Tract-B Pre Development	
4	Rational	19.41	1	25	29,121	-----	-----	-----	Tract-B Post Development	
5	Reservoir	5.477	1	31	15,124	2	490.34	9,486	Tract A Post Develop.	
6	Reservoir	12.80	1	34	29,089	4	484.05	12,390	Tract B Post Develop.	
21-0209-Oltman Northlake_03-08-2021.gpw					Return Period: 50 Year			Monday, 03 / 15 / 2021		

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	Rational	9.540	1	25	14,309	-----	-----	-----	Tract A pre development	
2	Rational	13.49	1	20	16,194	-----	-----	-----	Tract A Post Development	
3	Rational	15.16	1	30	27,294	-----	-----	-----	Tract-B Pre Development	
4	Rational	20.84	1	25	31,261	-----	-----	-----	Tract-B Post Development	
5	Reservoir	5.713	1	32	16,146	2	490.42	10,081	Tract A Post Develop.	
6	Reservoir	15.09	1	32	31,229	4	484.10	12,790	Tract B Post Develop.	
21-0209-Oltman Northlake_03-08-2021.gpw					Return Period: 100 Year			Monday, 03 / 15 / 2021		

Pond No. 1 - Tract A

Pond Data

Trapezoid -Bottom L x W = 80.0 x 80.0 ft, Side slope = 3.00:1, Bottom elev. = 490.50 ft, Depth = 3.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	490.50	6,400	0	0
0.30	490.80	6,691	1,964	1,964
0.60	491.10	6,989	2,052	4,015
0.90	491.40	7,293	2,142	6,158
1.20	491.70	7,604	2,234	8,392
1.50	492.00	7,921	2,329	10,720
1.80	492.30	8,245	2,425	13,145
2.10	492.60	8,575	2,523	15,668
2.40	492.90	8,911	2,623	18,291
2.70	493.20	9,254	2,725	21,015
3.00	493.50	9,604	2,829	23,844

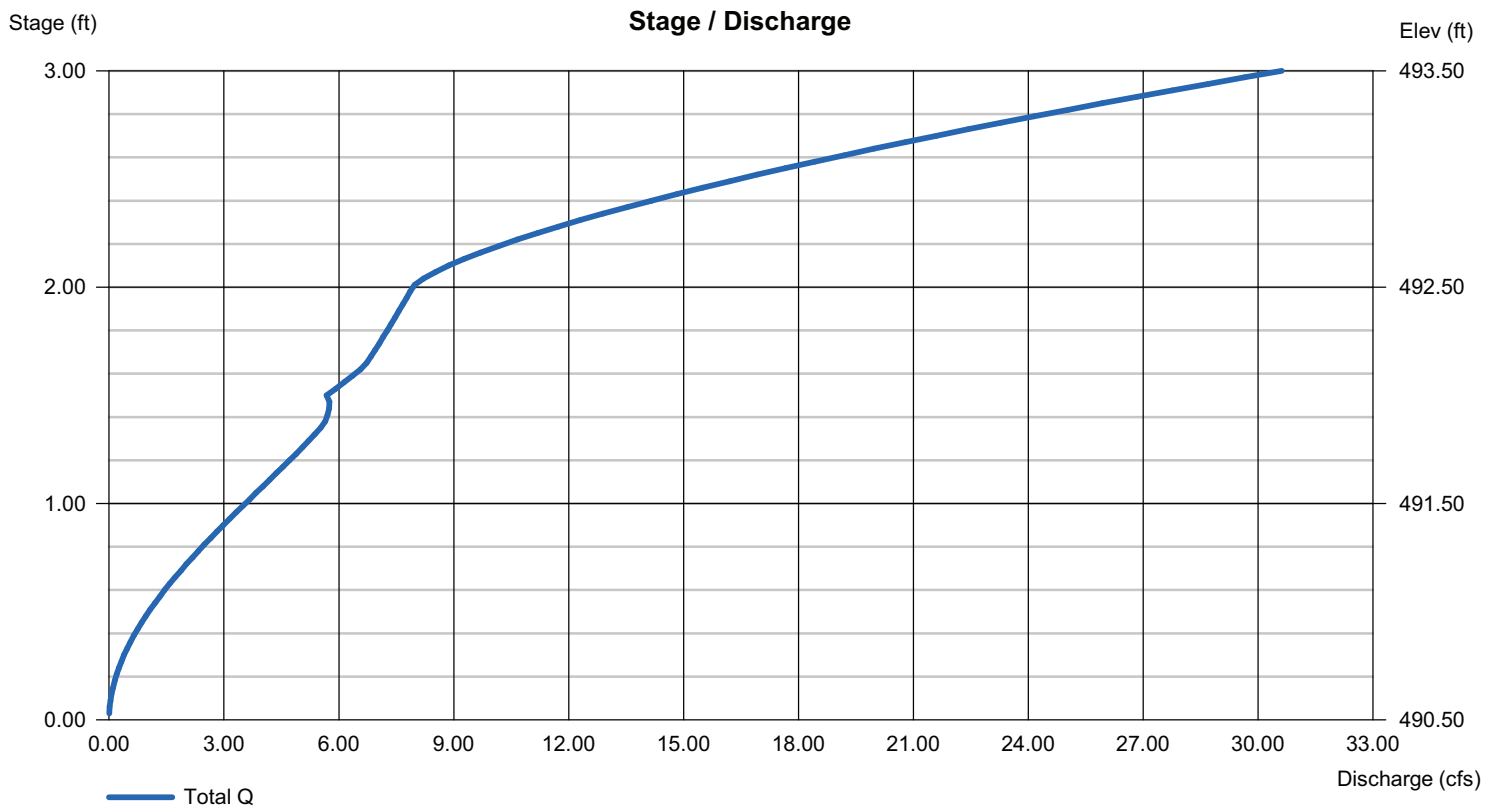
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	Inactive	Inactive	Inactive
Span (in)	= 18.00	15.00	30.00	0.00
No. Barrels	= 1	1	1	1
Invert El. (ft)	= 490.50	490.50	490.50	0.00
Length (ft)	= 40.00	40.00	40.00	0.00
Slope (%)	= 0.89	0.89	0.89	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.50	0.50	0.50	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.00	Inactive	Inactive	Inactive
Crest El. (ft)	= 492.50	481.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond No. 1 - Tract A

Pond Data

Trapezoid -Bottom L x W = 80.0 x 80.0 ft, Side slope = 3.00:1, Bottom elev. = 490.50 ft, Depth = 3.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	490.50	6,400	0	0
0.30	490.80	6,691	1,964	1,964
0.60	491.10	6,989	2,052	4,015
0.90	491.40	7,293	2,142	6,158
1.20	491.70	7,604	2,234	8,392
1.50	492.00	7,921	2,329	10,720
1.80	492.30	8,245	2,425	13,145
2.10	492.60	8,575	2,523	15,668
2.40	492.90	8,911	2,623	18,291
2.70	493.20	9,254	2,725	21,015
3.00	493.50	9,604	2,829	23,844

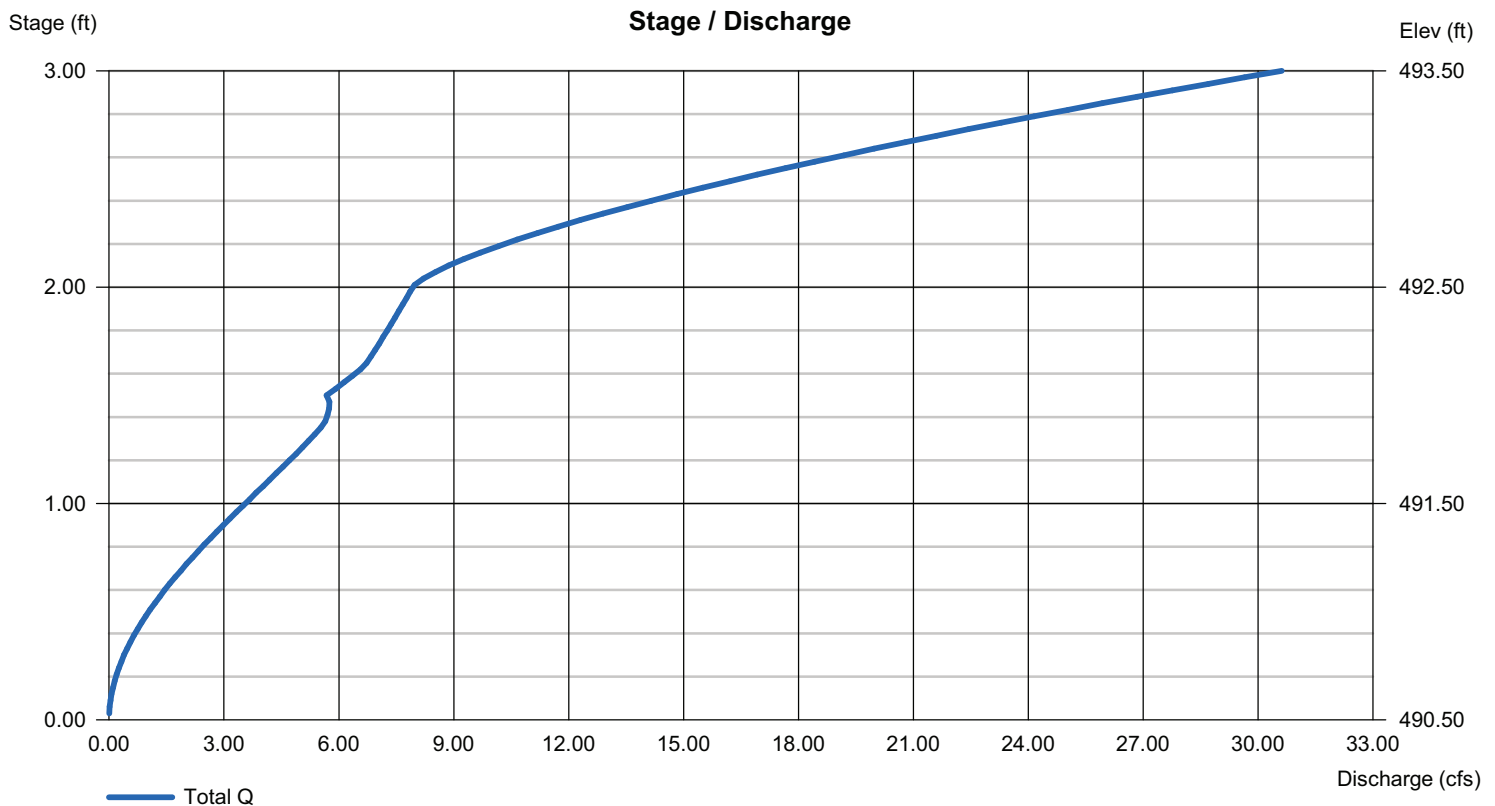
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	Inactive	Inactive	Inactive
Span (in)	= 18.00	15.00	30.00	0.00
No. Barrels	= 1	1	1	1
Invert El. (ft)	= 490.50	490.50	490.50	0.00
Length (ft)	= 40.00	40.00	40.00	0.00
Slope (%)	= 0.89	0.89	0.89	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.50	0.50	0.50	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.00	Inactive	Inactive	Inactive
Crest El. (ft)	= 492.50	481.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond Report

Pond No. 2 - Tract B

Pond Data

Trapezoid -Bottom L x W = 80.0 x 64.0 ft, Side slope = 3.00:1, Bottom elev. = 481.00 ft, Depth = 3.10 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	481.00	5,120	0	0
0.31	481.31	5,391	1,629	1,629
0.62	481.62	5,670	1,714	3,343
0.93	481.93	5,955	1,802	5,145
1.24	482.24	6,247	1,891	7,036
1.55	482.55	6,546	1,983	9,019
1.86	482.86	6,852	2,076	11,095
2.17	483.17	7,164	2,172	13,267
2.48	483.48	7,484	2,270	15,538
2.79	483.79	7,811	2,371	17,908
3.10	484.10	8,144	2,473	20,381

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	Inactive	Inactive	Inactive
Span (in)	= 24.00	15.00	30.00	0.00
No. Barrels	= 1	1	1	1
Invert El. (ft)	= 481.00	481.00	481.00	0.00
Length (ft)	= 40.00	40.00	40.00	0.00
Slope (%)	= 0.89	0.89	0.89	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.50	0.50	0.50	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	Inactive	Inactive	Inactive
Crest El. (ft)	= 483.00	412.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

